

We claim:

- 1 1. An apparatus for optical determination of distance to a
2 feature, said apparatus comprising:
3 a) a beam generation unit for launching a reference beam
4 on a reference path and a first beam on a first path;
5 b) a rotation mechanism for rotating said reference path
6 and said first path about a center along a line of
7 said reference path and not along a line of said first
8 path, wherein said reference beam moves over said
9 feature at a reference time t_r and said first beam
10 moves over said feature and at a first time t_1 ;
11 c) a determination unit for determining a distance r from
12 said center to said feature from an angular velocity
13 ω of said reference beam over said feature and from
14 said times t_r , t_1 .
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- 1 2. The apparatus of claim 1, wherein at least one of said
2 reference path and said first path further comprise a
3 non-collinear folded path portion.
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- 1 3. The apparatus of claim 1, wherein said rotation
2 mechanism comprises at least one element selected from
3 the group consisting of mirrors, refractive elements,
4 diffractive elements and holographic elements.
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- 1 4. The apparatus of claim 1, wherein said reference path
2 and said first path are in a common plane Σ .
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1 5. The apparatus of claim 1, wherein said determination
2 unit comprises a detector for detecting said reference
3 beam and said first beam.

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1 6. The apparatus of claim 1, wherein said beam generation
2 unit comprises a reference source for launching said
3 reference beam and a first source for launching said
4 first beam.

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1 7. The apparatus of claim 6, wherein said beam
2 generation unit comprises an active array of
3 sources.

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1 8. The apparatus of claim 6, wherein said reference
2 source and said first source have distinct
3 generation modes for endowing said reference beam
4 and said first beam with mutually distinguishing
5 properties.

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1 9. The apparatus of claim 8, wherein said
2 distinguishing properties are selected from
3 the group consisting of polarization,
4 wavelength, temporal beam format and
5 intensity.

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1 10. The apparatus of claim 9, wherein said
2 distinguishing properties comprise
3 wavelength and said determination unit
4 comprises at least one wavelength filter.

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11. The apparatus of claim 9, wherein said
determination unit comprises a reference
detector for detecting said reference beam
and a first detector for detecting said
first beam.

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12. The apparatus of claim 1, wherein said beam generation
unit launches a second beam on a second path chosen
such that said center is along a line of said second
path, said rotation mechanism rotates said second path
such that said second beam moves over said feature at
a second time t_2 , and determination unit determines
said angular velocity ω of said reference beam from
said times t_1 , t_2 .

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13. The apparatus of claim 12, wherein said beam
generation unit comprises a second source for
launching said second beam, and wherein said
second source has a distinct generation mode for
endowing said second beam with a distinguishing
property selected from the group consisting of
polarization, wavelength, temporal beam format and
intensity.

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14. The apparatus of claim 12, wherein said reference
path, said first path and said second path are in
a common plane Σ .

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1 15. The apparatus of claim 1, further comprising an
2 angular velocity unit for measuring said angular
3 velocity ω of said reference beam, said angular
4 velocity unit being in communication with said
5 determination unit.

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1 16. The apparatus of claim 1, wherein said feature is
2 selected from the group consisting of micro-structure
3 and macro-structure.

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1 17. An apparatus for optical determination of distance to a
2 feature, said apparatus comprising:

3 a) a beam generation unit for launching a reference beam
4 on a reference path and a first beam on a first path;

5 b) a rotation mechanism for rotating said reference path
6 and said first path about a center not along a line of
7 said reference path and not along a line of said first
8 path, whereby said reference beam moves over said
9 feature at a reference time t_r and said first beam
10 moves over said feature and at a first time t_1 ;

11 c) a determination unit for determining a distance r from
12 said center to said feature from an angular velocity
13 ω of said reference beam over said feature and from
14 said times t_r , t_1 .

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1 18. An apparatus for optical determination of distance to a
2 feature, said apparatus comprising:

3 a) a radiation detection unit for detecting radiation on
4 a reference path and on a first path;

- b) a rotation mechanism for rotating said reference path and said first path about a center along a line of said reference path and not along a line of said first path, whereby said radiation from said feature is detected on said reference path at a reference time t_r and on said first path at a first time t_1 ;
- c) a determination unit for determining a distance r from said center to said feature from an angular velocity ω of said reference path over said feature and from said times t_r , t_1 .

19. A method for optical determination of distance to a feature, said method comprising:

- a) launching a reference beam on a reference path and a first beam on a first path;
- b) rotating said reference path and said first path about a center along a line of said reference path and not along a line of said first path, whereby said reference beam moves over said feature at a reference time t_r and said first beam moves over said feature at a first time t_1 ;
- c) determining a distance r from said center to said feature from an angular velocity ω of said reference beam over said feature and from said times t_r , t_1 .

20. The method of claim 19, further comprising adding a non-collinear folded path portion to at least one of said reference path and said first path.

1 21. The method of claim 19, wherein said step of rotating
2 is performed with at least one element selected from
3 the group consisting of mirrors, refractive elements,
4 diffractive elements and holographic elements.

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1 22. The method of claim 19, wherein said reference path
2 and said first path are arranged in a common plane Σ .

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1 23. The method of claim 19, further comprising endowing
2 said reference beam and said first beam with mutually
3 distinguishing properties.

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1 24. The method of claim 23, wherein said
2 distinguishing properties are selected from the
3 group consisting of polarization, wavelength,
4 temporal beam format and intensity.

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1 25. The method of claim 19, further comprising:

2 a) launching a second beam on a second path chosen
3 such that said center is along a line of said
4 second path;

5 b) rotating said second path together with said
6 reference path and said first path about said
7 center such that said second beam moves over said
8 feature at a second time t_2 ; and

9 c) determining said angular velocity ω of said
10 reference beam from said times t_1 , t_2 .

1 26. The method of claim 25, further comprising
2 endowing said second beam with a distinguishing
3 property.

1 27. The method of claim 26, wherein said
2 distinguishing property is selected from the
3 group consisting of polarization, wavelength,
4 temporal beam format and intensity.

1 28. The method of claim 25, wherein said reference
2 path, said first path and said second path are in
3 a common plane Σ .

1 29. The method of claim 19, further comprising measuring
2 said angular velocity ω with an angular velocity
3 unit.

1 30. The method of claim 19, wherein said feature is
2 selected from the group consisting of micro-structure
3 and macro-structure.

1 31. A method for optical determination of distance to a
2 feature, said method comprising:

3 a) launching a reference beam on a reference path and a
4 first beam on a first path;

5 b) rotating said reference path and said first path about
6 a center not along a line of said reference path and
7 not along a line of said first path, whereby said
8 reference beam moves over said feature at a reference

9 time t_r and said first beam moves over said feature at
10 a first time t_1 ;
11 c) determining a distance r from said center to said
12 feature from an angular velocity ω of said reference
13 beam over said feature and from said times t_r , t_1 .
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1 32. A method for optical determination of distance to a
2 feature, said method comprising:
3 a) providing a reference path and a first path for a
4 radiation;
5 b) rotating said reference path and said first path about
6 a center along a line of said reference path and not
7 along a line of said first path, whereby radiation
8 from said feature is detected on said reference path
9 at a reference time t_r and on said first path at a
10 first time t_1 ;
11 d) determining a distance r from said center to said
12 feature from an angular velocity ω of said reference
13 path over said feature and from said times t_r , t_1 .
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